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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,839	08/04/2003	Pavel N. Laptev	SPUTT-65056	5260
23910 7590 01/31/2007 FLIESLER MEYER LLP 650 CALIFORNIA STREET 14TH FLOOR SAN FRANCISCO, CA 94108			EXAMINER MCDONALD, RODNEY GLENN	
			ART UNIT 1753	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		01/31/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/633,839

Applicant(s)

LAPTEV, PAVEL N.

Examiner

Rodney G. McDonald

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 22-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 22-25, 30-35 and 37-42 is/are rejected.
- 7) ☒ Claim(s) 26-29 and 36 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 22-25, 30-35 and 37-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huebner (U.S. Pat. 4,950,377) in view of Obinata (U.S. Pat. 4,624,767).

Regarding claims 22, 30, 31, 37, Huebner teach a method of etching by providing a relatively strong electric field at a first position in the enclosure. (Column 3 lines 45-49) Huebner teach a method of etching by providing a relatively weak electrical field at a second positions displaced in the enclosure from the first position. The weak electrical field defining a capacitor with a high impedance to limit the transfer of electrical charges to the insulating layer in the wafer. (Column 3 lines 49-51) A magnetic field is provided in the enclosure in a direction relative to the strong electrical field to obtain a movement of electrons in the enclosure at the positions of the strong electrical field and an ionization of molecules by the electrons and a movement of the ions in a direction relative to the weak electrical field to obtain a movement of ions, in accordance with the high impedance of the capacitor defined by the relatively weak field, to the second electrode at a speed for etching the surface. (Column 3 lines 52-56; Column 3 lines 62-68; Column 4 lines 1-2)

Regarding claims 23, 31, 35, the strong electric field is provided in a first direction and the weak electrical field is provided in the second direction. A magnetic field is provide transverse to the first and second directions to produce a movement of the electrons in a helical path for facilitating the ionization of molecules. (Column 3 lines 52-56; Column 3 lines 62-68)

Regarding claims 24, 31, 34, 39, the substrate is disposed in the weak electrical field. (Column 3 liens 51-52) The gas is ionized initially in the strong electrical field moving to the weak electrical field for etching. (Column 3 lines 62-68)

Regarding claim 25, the substrate is disposed in the weak electrical field.  
(Column 3 lines 51-52)

Regarding claims 32, 38, 42, Huebner teach that the strong electrical field is defined in part by an alternating voltage applied to the first electrode to bias the first electrode at a negative DC potential with a first magnitude and wherein the weak electric field is defined by a second electrode and by an alternating voltage applied to the second electrode at a second magnitude less than the first magnitude for etching. (Column 3 lines 45-51; Column 4 lines 57-61)

The differences between Huebner and the present claims is that the etching of an insulating layer is not discussed (Claims 22, 24, 30), utilizing an inert gas for etching is not discussed (Claims 22, 24, 30), disposing the electrode that provides the weak electrical field at a distance from the wafer and providing a capacitor in a circuit is not discussed (Claim 25), the magnetic members and electrodes defining the enclosure is

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not discussed (claims 33, 40) and the wafer at a floating potential and the magnets being at a ground potential are not discussed (Claim 41).

Regarding claims 22, 24, 37, Obinata teach utilizing an inert gas for etching an insulating material such as silicon. The silicon can contain sensitive materials such as fine patterns for VLSI. (Column 1 lines 29-40; Column 2 lines 15-34)

Regarding claim 25, Obinata teach spacing the wafer 3 from the electrode 2 by utilizing an insulating layer 4. (Column 2 lines 20-25) Huebner discussed above and teach utilizing a capacitor in a circuit. (Column 3 lines 49-51)

Regarding claims 33, 40, Obinata show that the magnetic members and electrodes can define the enclosure. (See Fig 2)

Regarding claim 41, the wafer is at a floating potential due to the dielectric layer 4 insulating the wafer from the electrode and the magnets are grounded because the walls of the chamber are grounded. (See Fig. 2)

The motivation for utilizing the features of Huebner is that it allows for preventing fine injuries to a substrate. (Column 1 lines 49-52)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified Huebner by utilizing the features of Obinata because it allows for preventing fine injuries.

***Allowable Subject Matter***

Claims 26-29 and 36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Claim 26-29 are indicated as being allowable over the prior art of record because the prior art of record does not teach the claimed subject matter including a capacitor constituting a first capacitor and wherein the relatively weak electrical field is defined by the first capacitor and a second capacitor in a series circuit and wherein the first capacitor is defined by plates constituting an electrode and the wafer and in which the plates are separated by a space in which molecules and ions of the inert gas are disposed to define the insulator for the capacitor and to provide the first capacitor with the high impedance and wherein a second capacitor is defined by plates constituting the wafer and the ions of the inert gas in the enclosure and wherein the plates are separated by the insulating layer in the wafer to define the insulator of the second capacitor and to provide the second capacitor with a relatively low impedance in comparison to the high impedance of the first capacitor.

Claim 36 is indicated as being allowable over the prior art of record because the prior art of record does not teach the claimed subject matter including the second and the wafer constituting plates of a first capacitor and ions and molecules of the inert gas constituting the dielectric of the first capacitor and wherein the wafer and the ions of the

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inert gas constituting plates of a second capacitor and wherein the insulating layer of the wafer constituting the dielectric of the second capacitor and wherein the first capacitor has a higher impedance than the second capacitor.

### ***Response to Arguments***

Applicant's arguments filed November 16, 2006 have been fully considered but they are not persuasive.

In response to the argument that neither Huebner or Obinata fails to teach providing a relatively strong electric field and a relatively weak field, positioned with a magnetic field to obtain movement of electrons and ions for etching an insulator surface, it is argued that Huebner teach providing a relatively strong electric field to electrode E1 by providing a high frequency voltage and magnetic field to E1. A relatively weak field is provide to electrode E2 by providing a low frequency voltage and magnetic field to E2. Furthermore a capacitor is provided to E2 similar to applicant's capacitor which has the effect of controlling the electric field on E2 to be a relatively weak field. The high and weak electric fields are set up by the use of high and low frequency voltages. Since Huebner substrate placed on E2 is free from charges the ions will not bombard the substrate in order to cause pitting which is an effect that is the same as Applicant's. (See Huebner discussed above)

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney G. McDonald whose telephone number is 571-272-1340. The examiner can normally be reached on M- Th with Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Rodney G. McDonald  
Primary Examiner  
Art Unit 1753

RM

January 29, 2007